

SHARP SERVICE MANUAL

CODE:00ZXEA40SUSME



ELECTRONIC CASH REGISTER

MODEL XE-A40S

CONTENTS

CAUTION

CHAPTER 1. SPECIFICATIONS

[1] APPEARANCE.....	1-1
[2] RATING.....	1-1
[3] KEYBOARD	1-1
[4] MODE SWITCH	1-1
[5] DISPLAY	1-2
[6] PRINTER	1-3
[7] DRAWER	1-3
[8] BATTERY	1-3

CHAPTER 2. OPTIONS

[1] OPTIONS (NO)	2-1
[2] SERVICE OPTIONS (NO)	2-1
[3] SUPPLIES.....	2-1

CHAPTER 3. MASTER RESET AND PROGRAM RE-SET

[1] MASTER RESETTING.....	3-1
[2] PROGRAM RESETTING (INITIALIZATION)	3-1

CHAPTER 4. HARDWARE DESCRIPTION

[1] BLOCK DIAGRAM.....	4-1
[2] MEMORY MAP.....	4-1
[3] PRINTER CONTROL	4-1
[4] I/O.....	4-2
[5] KEY-DISPLAY.....	4-4
[6] POWER SUPPLY	4-5
[7] REWRITING FLASH MEMORY	4-5
[8] DRAWER.....	4-5
[9] PRINT RATE	4-5
[10] A/D CONVERSION	4-5
[11] BUZZER	4-5
[12] USB I/F	4-5
[13] RESET.....	4-5

CHAPTER 5. DIAGNOSTIC PROGRAM

[1] TEST ITEMS	5-1
[2] DESCRIPTION OF EACH DIAG PROGRAM.....	5-1
[3] KEY CODE TABLE.....	5-4

CHAPTER 6. IPL FROM EP-ROM

CHAPTER 7. CIRCUIT DIAGRAM AND PWB LAYOUT

Parts marked with "▲" are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

CAUTION

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED
BY AN INCORRECT TYPE.

DISPOSE OF USED BATTERIES ACCORDING
TO THE INSTRUCTIONS.

AVOID: SHORT-CIRCUITING THE BATTERY TERMINALS.
KEEP THE BATTERY AWAY FROM FIRE.

* WHEN DISPOSING THE BATTERY, FOLLOW THE LOCAL
RULES AND REGULATIONS.

“BATTERY DISPOSAL”

THIS PRODUCT CONTAINS NICKEL-METAL HYDRIDE BATTERY.

THIS BATTERY MUST BE DISPOSED OF PROPERLY.

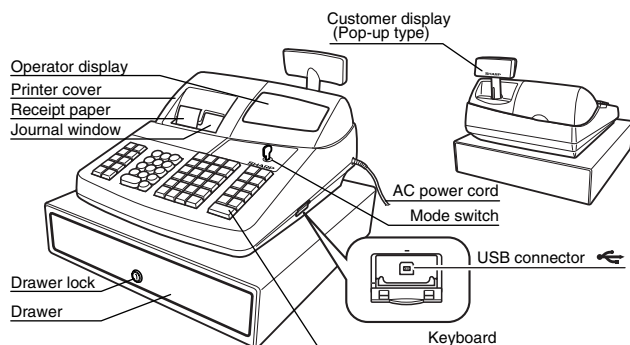
REMOVE THE BATTERY FROM THE PRODUCT AND CONTACT FEDERAL OR
STATE ENVIRONMENTAL AGENCIES FOR INFORMATION ON RECYCLING AND
DISPOSAL OPTIONS.

CHAPTER 1. SPECIFICATIONS

[1] APPEARANCE

■ Front view

■ Rear view



[2] RATING

	XE-A40S
Weight	28.0lb (12.7kg)
Dimensions	420 (W) x 427 (D) x 297 (H) mm 16.5 (W) x 16.8 (D) x 11.7 (H) inches
Power source	AC 120V (m10%), 60Hz
Power consumption	Stand-by 8.6W, Operating 49W (max.)
Working temperature	0°C–40°C (32°F to 104°F)

[3] KEYBOARD

1. KEYBOARD LAYOUT

Type	Normal keyboard
Key position	STD/MAX 59
Key pitch	19 (W) x 19 (H) mm
Key layout	Fixed type

2. KEY LIST

2.1. Keyboard layout

↑ RECEIPT	↑ JOURNAL	@/FOR	•	CL	PLU/SUB	DEPT #	DEPT SHIFT	CLK#	TAX U	AUTO X
RA	%1	7	8	9	25 A	10 F	15 K	20 P	TAX1 SHIFT V	TAX2 SHIFT Y
RCPT/PO	%2	4	5	6	24 B	9 G	14 L	19 Q	CONV W	CH1 Z
VOID DC	RFND SHIFT	1	2	3	23 C	8 H	13 M	18 R	CHK	CH2
ESC BS	SPACE	0	00		22 D	7 I	12 N	17 S	MDSE SBTL	#/TM SBTL
					21 E	6 J	11 O	16 T	CA/AT/NS	

NOTE: The small characters on the bottom or lower right in each key indicates functions or characters which can be used for character entries for text programming.

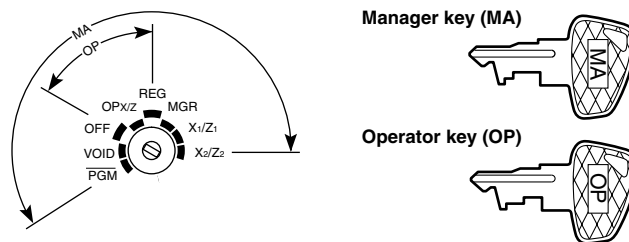
2.2. Key names

KEY TOP	DESCRIPTION
↑ (RECEIPT)	Receipt paper feed key
↑ (JOURNAL)	Journal paper feed key
RA	Received-on account key
RCPT/PO	Receipt print/Paid-out key
VOID	Void key
ESC	Escape key
%1, %2	Percent 1 and 2 key
RFND	Refund key
⊖	Discount key
&/FOR	Multiplication key
•	Decimal point key
CL	Clear key
0-9,00	Numeric Keys
PLU/SUB	PLU/Subdepartment key
DEPT#	Department code entry key
DEPT SHIFT	Department shift key
CLK#	Clerk code entry key
Dept1-40	Department keys
TAX	Tax key
Tax 1 SHIFT	Tax 1 shift key
Tax 2 SHIFT	Tax 2 shift key
AUTO	Automatic sequence key
CONV	Conversion key
CHK	Check key
CH1, CH2	Charge 1 and 2 keys
MDSE SBTL	Merchandise subtotal key
#/TM/STBL	Non-add code/Time display/Subtotal key
CA/AT/NS	Total/Amount tender/Non Sale key

[4] MODE SWITCH

1. LAYOUT

- Rotary type



The mode switch can be operated by inserting one of the two supplied mode keys - manager (MA) and operator (OP) keys. These keys can be inserted or removed only in the "REG" or "OFF" position.

XE-A40S

The mode switch has these settings:

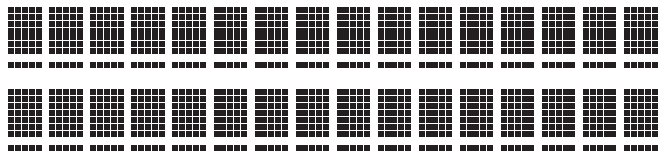
- OFF: This mode locks all register operations. (AC power turns off.)
No change occurs to register data.
- OP X/Z: To take individual clerk X or Z reports, and to take flash reports.
It can be used to toggle receipt state "ON" and "OFF" by pressing he [RCP/PO] key.
- REG: For entering sales.
- PGM: To program various items.
- VOID: Enters into the void mode. This mode allows correction after finalizing a transaction.
- MGR: For manager's entries. The manager can use this mode for an override entry.
- X1/Z1: To take the X/Z report for various daily totals.
- X2/Z2: To take the X/Z report for periodic (weekly or monthly) consolidation.

[5] DISPLAY

1. OPERATOR DISPLAY

- Display device : LCD
- Number of line : 2 line
- Number of positions : 16 positions
- Color of display : Yellow / Green
- Character form : 7 segment + Dp
- Character size : Approx. 8.0mm (H) x 4.8mm (W)

Layout:



2. CUSTOMER DISPLAY

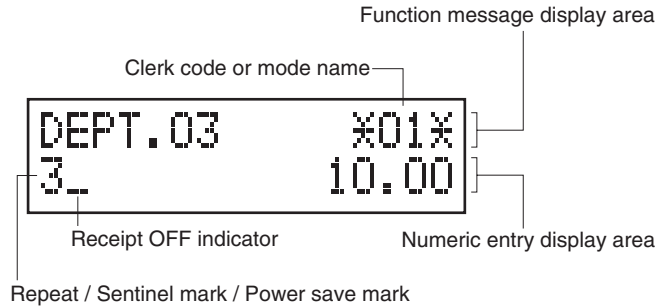
- Display device : LED
- Number of line : 1 line
- Number of positions : 7 positions
- Color of display : Yellow / Green
- Style : Pop up type
- Character form : 7 segment + Dp
- Character size : 14.0mm (H) x 8.0mm (W)

Layout:



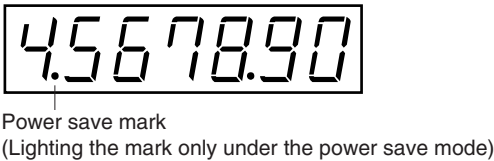
3. DESCRIPTION

3.1. Operator display



- Clerk code or Mode name
The mode you are in is displayed. When a clerk is assigned, the clerk code is displayed in the REG or OP X/Z mode. For example, "*01*" is displayed when clerk 01 is assigned.
- Repeat
The number of repeats is displayed, starting at "2" and incremental with each repeat. When you have registered ten times, the display will show "0" (2→3.....9→0→1→2...)
- Sentinel mark
When amount in the drawer reaches the amount you preprogrammed, the sentinel mark "X" is displayed to advise you to remove the money and put it in a safe place.
- Power save mark
When the cash register goes into the power save mode, the power save mark (decimal point) lights up.
- Function message display area
Item labels of departments and PLU/subdepartments and function texts you use, such as %1, (-) and CASH are displayed.
When an amount is to be entered or entered, "AMOUNT" is displayed: When an amount is to be entered, ----- is displayed at the numeric entry area with "AMOUNT". When a preset price has been set, the price is displayed at the numeric entry area with "AMOUNT".
- Numeric entry display area
Numbers entered using numeric keys are displayed here.
- * Date and time display
Date and time appear on the display in the OP X/Z, REG, or MGR mode. In the REG or MGR mode, press the [#TM/SBTL] key to display the date and time.
- * Error message
When an error occurs, the corresponding error message is displayed in the function message display area.

3.2. Customer display (Pop-up type)



[6] PRINTER

1. PRINTER

- Part number : PR-45M II
- NO. of station : 2 (Receipt and journal)
- Validation : No
- Printing system : Line thermal
- No. of dot : Receipt 288 dots
Journal 288 dots
- Dot pitch : Horizontal 0.125mm
Vertical 0.125mm
- Font : 10 dots (W) x 24 dots (H)
- Printing capacity : Receipt max. 24 characters
Journal max. 24 characters
- Character size : 1.25mm (W) x 3.0mm (H) at 10 x 24 dots
- Print pitch : Column distance 1.5mm
Row distance 3.75mm
- Print speed : Approximate 50mm/s (13.3 lines/sec)
- Paper feed speed : Approximate 40mm/s (Manual feed)
- Reliability : Mechanism MCBF 5 million lines
Head life 12.5 million characters (at 4 dots/1 character/1 element)
- Paper end sensor : Set up (Receipt and journal)
- Cutter : Manual
- Near end sensor : No

* PR-45M II is not equipped with the gear cover. It is the only difference of PR-45M II and PR-45M. When servicing PR-45M II printer unit, the manual of PR-45M will serve as a reference.

2. PAPER

- Paper roll : 44.5 m \pm 0.5mm in width
dimension Max. 80mm in diameter
- Paper quality : (Journal/Receipt)
High-quality paper
paper thickness: 0.06 to 0.08mm
Nihon seisi thermal : TF50KS-E
paper
Oji thermal paper : PD150R, PD160R

3. LOGO STAMP

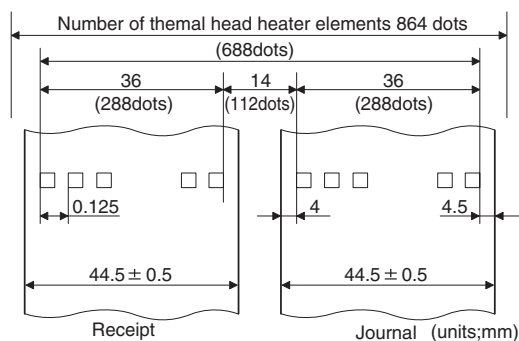
- No

4. CUTTER

- Method : Manual

5. PRINTING AREA

Receipt & Journal



[7] DRAWER

1. OUTLINE

- Standard equipment: Yes
- Max. number of additional drawers: 0
- The drawer consists of:
 - 1) Drawer box (outer case) and drawer
 - 2) Coin case
 - 3) Money case
 - 4) Lock (attached to the drawer)

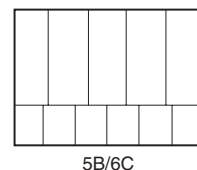
2. SPECIFICATION

2.1. DRAWER BOX AND DRAWER

Model name of the drawer box	SK423
Size	420 (W) x 426 (D) x 114 (H) mm 16.5 (W) x 16.8 (D) x 4.5 (H) inches
color	Gray (PB-N8.0)
Material	Metal
Bell	-
Release lever	Standard equipment: located at the bottom
Drawer open sensor	-
Separation from the main unit	-

2.2. MONEY CASE

Separation from the drawer	Allowed
Separation of the bill compartments from the coin compartments	Allowed
Bill separator	Disallowed
Number of compartments	5B/6C

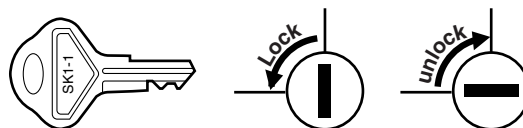


2.3. LOCK (LOCK KEY : LKGIM7331BHZZ)

- Location of the lock: Front
- Method of locking and unlocking:

To lock, insert the drawer lock key into the lock and turn it 90 degrees counter clockwise.

To unlock, insert the drawer lock key and turn it 90 degrees clockwise.
- Key No: SK1-1



[8] BATTERY

1. MEMORY BACK UP BATTERY

Built-in battery : Rechargeable batteries, memory holding time about 1 month (with fully charged built-in batteries, at room temperature)

CHAPTER 2. OPTIONS**[1] OPTIONS (NONE)****[2] SERVICE OPTIONS (NONE)****[3] SUPPLIES**

NO	NAME	PARTS CODE	PRICE RANK	DESCRIPTION
1	Thermal roll paper	TPAPR6645RC05	BA	5 ROLLS/PACK

CHAPTER 3. MASTER RESET AND PROGRAM RESET

[1] MASTER RESETTING

Master resetting clears the entire memory and resumes default values.

Master resetting can be accomplished by using the following procedure:

- Procedure A:
- 1) Unplug the AC cord from the wall outlet.
 - 2) Set the mode switch to the PGM position.
 - 3) While holding down both the JOURNAL FEED key and [CL] key, plugin the AC cord to the wall outlet.

The master reset can also be accomplished in the following case.

In case power failure occurs when the machine has no battery attached to it, the master reset operation is automatically performed after the power has been restored.

(This is because if power failure occurs with no battery attached to the machine, all the memory will be lost and the machine does not work properly after power recovery; this requires the master reset operation.)

[2] PROGRAM RESETTING (INITIALIZATION)

This resetting resumes the initial program without clearing memory.

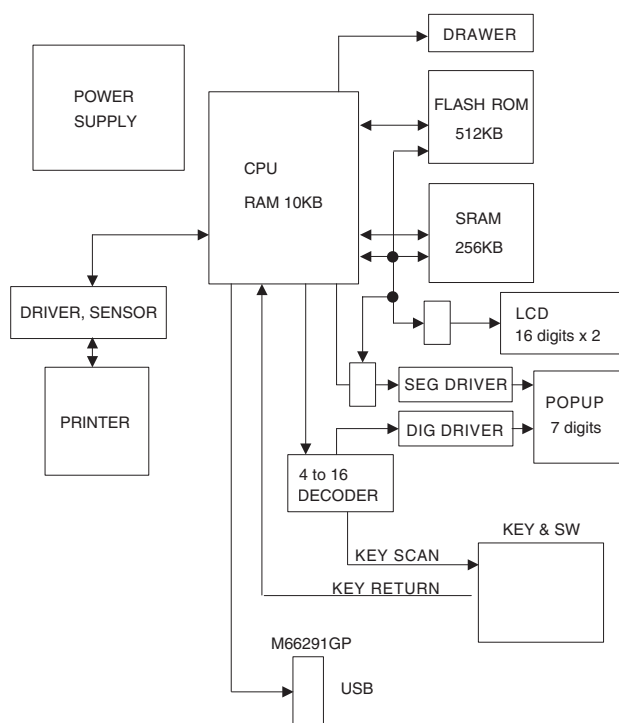
This resetting can be operated at below sequence in PGM mode.

- Procedure:
- 1) Unplug the AC cord from the wall outlet.
 - 2) Set the mode switch to the PGM position.
 - 3) While holding down both JOURNAL FEED key and RECEIPT FEED key, plugin the AC cord to the wall outlet.

NOTE: In case power failure occurs when the machine has no battery attached to it, the master reset operation is automatically performed after the power has been restored.

CHAPTER 4. HARDWARE DESCRIPTION

[1] BLOCK DIAGRAM



CPU

M30620SAFP (MITSUBISHI, internal RAM 10KB)

External memory

RAM	256KB
FLASH ROM	512KB
	SHARP LH28F004BVT
PRINTER	PR45M II
USB controller	RENESAS M66291GP

[2] MEMORY MAP

1. ADDRESS MAP

	BANK 0	BANK 1
/CS0	0	0
BA0	0	1
00000h	Internal RAM area 10KB	
00400h		
02C00h		
04000h	Internal reserved area	
08000h		
08000h	External I/O	
28000h		
28000h	External SRAM 1 128KB	
30000h		
30000h	External I/O (USB controller)	
40000h		
40000h	External SRAM 2 128KB	
50000h		
50000h	External reserved area	
80000h		
C0000h	IPL MODE OFF: Flash ROM ON: EP ROM	IPL MODE OFF: EP ROM ON: Flash RPM
FFFFFh		

Only the BANK in /CS area(30000h-FFFFFh) is effective.

2. EXTERNAL BUS

External BUS Access Speed *1BCLK=83.3ns (at 12MHz)	SRAM:	2BCLK
	EPROM:	2BCLK
	FLASH ROM:	2BCLK
	External I/O:	2BCLK
SRAM	/CS2 Area	address 08000h~27FFFh 128KB
	/CS0 Area BANK0	address 30000h~4FFFFh 128KB
FLASH ROM	/CS0 Area BANK0	address 80000h~FFFFFh 512KB
	*Moves to Bank 1 when rewritten using EPROM	

[3] PRINTER CONTROL

1. STEPPING MOTOR CONTROL

The stepping motor is driven at a constant voltage by Sanken STA471A.

1step: 0.125mm, A1dot: 1step

Printing speed 50mm/s

1.1. CPU's PORT

No.	CPU PORT	Signal to be used
80	P10	RAS
79	P11	RBS
78	P12	RCS
77	P13	RDS
76	P14	JAS
75	P15	JBS
74	P16	JCS
73	P17	JDS

1.2. Driving steps

RECEIPT MOTOR

STEP	Driver IC input (CPU output)				Motor driving signal			
	RAS	RBS	RCS	RDS	/ RPFA	/ RPFB	/ RPFC	/ RPFD
1	H	L	L	H	L	H	H	L
2	L	H	L	H	H	L	H	L
3	L	H	H	L	H	L	L	H
4	H	L	H	L	L	H	L	H

STEP	Driver IC input (CPU output)				Motor driving signal			
	JAS	JBS	JCS	JDS	/ JPFA	/ JPFB	/ JPFC	/ JPFD
1	L	H	H	L	H	L	L	H
2	L	H	L	H	H	L	H	L
3	H	L	L	H	L	H	H	L
4	H	L	H	L	L	H	L	H

- * When stopping the motor, all energizing to the phase is turned off by giving the rush current of 10ms to the same phase as a final excitation phase. → Turn all RAS ~ RDS and JAS ~ JDS into L.

No energizing should be allowed at least 30 ms after stopping the motor before restarting.

When the motor is started, the rush current of 10ms is given to the first excitation phase.

2. HEAD CONTROL

HEAD: 832 dots in all. Printable range: 384 dots at receipt side;
384 dots at journal side

Related PORT

No.	CPU PORT	Signal to be used
30	TXD2	SO
29	RXD2	SI
28	CLK2	PCLK
93	P103	/STRB1
92	P104	/STRB2
91	P105	/STRB3
90	P106	/STRB4
89	P107	LATCH
21	P81	VHCOM

/STB1: 1 ~ 288dot: 288 dots in all
/STB2: 289 ~ 432dot: 144 dots in all
/STB3: 433 ~ 576dot: 144 dots in all
/STB4: 577 ~ 864dot: 288 dots in all

Total 864 dots

- * When turning on or off the printer power supply, make sure to turn /STB1, 2, 3, 4 to "H".
- * Do not turn on without paper.
- * THERMAL HEAD power supply control : Turns ON when P81= "H"; turns OFF when "L". (The power supply for HEAD and STEPPING MOTOR is shared). When printing is finished (when the motor is stopped) the power should be turned OFF.
- * Before printing or feeding paper, perform A/D conversion in ** ms after the printer head is turned ON and make sure the voltage is stable.
(The power supply of the printer head should be turned ON and OFF by using the regulator IC.)

[4] I/O

M16C/62 PORT

Memory space: Normal mode

Processor mode: Use it in Micro processor mode (Separate BUS/width=8bit)

PORT	PIN No.	I/O	Pin name	Signal name	Initial value	OFF MODE	Function
P00	88	I/O	D0	D0		OUT L	
P01	87	I/O	D1	D1		OUT L	
P02	86	I/O	D2	D2		OUT L	
P03	85	I/O	D3	D3		OUT L	
P04	84	I/O	D4	D4		OUT L	
P05	83	I/O	D5	D5		OUT L	
P06	82	I/O	D6	D6		OUT L	
P07	81	I/O	D7	D7		OUT L	
P10	80	O	P10	RAS	L	OUT L	Receipt paper feed A
P11	79	O	P11	RBS	L	OUT L	Receipt paper feed B
P12	78	O	P12	RCS	L	OUT L	Receipt paper feed C
P13	77	O	P13	RDS	L	OUT L	Receipt paper feed D
P14	76	O	P14	JAS	L	OUT L	Journal paper feed A
P15	75	O	P15	JBS	L	OUT L	Journal paper feed B
P16	74	O	P16	JCS	L	OUT L	Journal paper feed C
P17	73	O	P17	JDS	L	OUT L	Journal paper feed D
P20	72	O	A0	A0		OUT L	
P21	71	O	A1	A1		OUT L	
P22	70	O	A2	A2		OUT L	
P23	69	O	A3	A3		OUT L	
P24	68	O	A4	A4		OUT L	
P25	67	O	A5	A5		OUT L	
P26	66	O	A6	A6		OUT L	

PORT	PIN No.	I/O	Pin name	Signal name	Initial value	OFF MODE	Function
P27	65	O	A7	A7		OUT L	
P30	63	O	A8	A8		OUT L	
P31	61	O	A9	A9		OUT L	
P32	60	O	A10	A10		OUT L	
P33	59	O	A11	A11		OUT L	
P34	58	O	A12	A12		OUT L	
P35	57	O	A13	A13		OUT L	
P36	56	O	A14	A14		OUT L	
P37	55	O	A15	A15		OUT L	
P40	54	O	A16	A16		OUT L	
P41	53	O	A17	A17		OUT L	
P42	52	O	A18	A18		OUT L	
P43	51	O	A19	A19		OUT L	
P44	50	O	/CS0	/CS0		OUT H	
P45	49	O	/CS1	/CS1		OUT L	USB CONTROLLER
P46	48	O	/CS2	/CS2		OUT H	
P47	47	O	/CS3	/CS3		OUT L	
P50	46	O	/WR	/WR		OUT L	
P51	45	O	/BHE	(NU)		OUT L	
P52	44	O	/RD	/RD		OUT L	
P53	43	O	BCLK	BCLK		OUT L	
P54	42	O	/HLDA	(NU)		OUT L	
P55	41	I	/HOLD	/HOLD		IN	
P56	40	O	ALE	(NU)		OUT L	
P57	39	I	/RDY	/RDY		IN	
P60	38	I	P60	/KR0		IN	Key Return Signal 0
P61	37	I	P61	/KR1		IN	Key Return Signal 1
P62	36	I	P62	/KR2		IN	Key Return Signal 2
P63	35	I	P63	/KR3		IN	Key Return Signal 3
P64	34	I	P64	/KR4		IN	Key Return Signal 4
P65	33	I	P65	/KR5		IN	Key Return Signal 5
P66	32	I	P66	/KR6		IN	Key Return Signal 6
P67	31	I	P67	/KR7		IN	Key Return Signal 7
P70	30	O	TXD2	SO	L	OUT L	PRINTER DATA OUT
P71	29	I	RXD2	SI		IN	PRINTER DATA IN
P72	28	O	CLK2	PCLK	L	OUT L	PRINTER CLOCK
P73	27	O	P73	DR1	L	OUT L	DRAWER 1 DRIVE SIGNAL
P74	26	O	P74	/USBRST	L	OUT L	USB RESET SIGNAL
P75	25	O	P75	(NU)	L	OUT L	
P76	24	O	P76	(NU)	L	OUT L	
P77	23	O	P77	(NU)	L	OUT L	
P80	22	O	P80	BUZZER	L	OUT L	BUZZER
P81	21	O	P81	VHCOM	L	OUT L	PRINTER HEAD CONTROL
P82	20	I	/INT0	POFF		IN	POWER INTERRUPT
P83	19	I	/INT1	/DREQUSB		IN	USB DMA REQUEST
P84	18	I	/INT2	/INTUSB		IN	USB INTERRUPT
P85	17	I	/NMI	/NMI(NU)		IN	
P86	11	O	XCOUT	XCOUT			32.768kHz
P87	10	I	XCIN	XCIN			32.768kHz
P90	7	I	P90	MODE		IN	MODE KEY SENSE
P91	6	I	P91	MSENS		IN	MISCELLANEOUS SENSE
P92	5	O	P92	(NU)	L	OUT L	
P93	4	O	P93	BA0	L	OUT L	BANK SIGNAL 0
P94	3	O	P94	DATE/CE	L	OUT L	LCD DATA LATCH SIGNAL
P95	2	O	P95	BLON	L	OUT L	BACK LIGHT ON
P96	1	O	P96	LCDON	L	OUT L	LCD POWER ON
P97	100	I	P97	IPLON		IN	IPL ON SIGNAL
P100	97	I	AN0	TM		IN	HEAD TEMPERATURE MONITOR
P101	95	I	AN1	VPTEST		IN	HEAD VOLTAGE MONITOR
P102	94	I	AN2	VREF		IN	REFERENCE VOLTAGE
P103	93	O	AN3	/STRB1	H	IN	PRINTER STORE SIGNAL 1
P104	92	O	AN4	/STRB2	H	IN	PRINTER STORE SIGNAL 2
P105	91	O	P105	/STRB3	H	IN	PRINTER STORE SIGNAL 3
P106	90	O	P106	/STRB4	H	IN	PRINTER STORE SIGNAL 4

PORT	PIN No.	I/O	Pin name	Signal name	Initial value	OFF MODE	Function
P107	89	O	P107	LATCH	L	IN	PRINTER LATCH SIGNAL

POWER SUPPLY/CONTROL TERMINAL

PORT	PIN No.	I/O	Pin name	Function
BYTE	8	I	BYTE	Connected to VCC
CNVss	9	I	CNVss	Connected to GND
/RESET	12	I	/RESET	
Xout	13	O	Xout	Connected to XTAL
Vss	14		Vss	Connected to GND
Xin	15	I	Xin	Connected to XTAL
Vcc	16		Vcc	Connected to VCC
Vcc	62		Vcc	Connected to VCC
Vss	64		Vss	Connected to GND
Avss	96		AVss	Connected to GND
Vref	98		Vref	Connected to VCC
Avcc	99		Avcc	Connected to VCC

[5] KEY-DISPLAY**1. LCD CONTROL****1.1. LCD CONTROL****LCD-related registers**

Function	Address	R/W
LCD Write Data	04001h	W
LCD Read Data	04002h	R
LCD Control Signal	04003h	W
Data Latch Signal	CPU port P94	W

1.1.1 LCD Control Signal / Key Strobe Signal

Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
04003h	—	E	R/W	RS	—	—	—	—

Bit7 : Not used

Bit6 : E

Enable Signal  Enable

Bit5 : R/W

H : Data read L : Data Write

Bit4 : RS

H : Data input L : Instruction Input

1.1.2 Data Latch Signal

L : LCD write data latch

2. KEY/DISPLAY SCAN

On the XE-A40S, the key and display scan signal is common.

KEY/DISPLAY SCAN and key read should be performed at the following timing.

- 1) KEY/DISPLAY SCAN cycle: 10ms
- 2) Blanking time: 50us
- 3) KEY DATA READ timing: More than 10 ms from the fall of the SCAN signal

Key / Display-related registers

Function	Address	R/W
LED Segment Signal	04000h	W
Key Strobe Signal	04003h	W
Key Return Signal	CPU port	R

2.1. LED Segment Signal

Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
04000h	dp	g	f	e	d	c	b	a

2.2. Key Strobe Signal

Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
04003h	—	—	—	—	KS3	KS2	KS1	KS0

Bit3 ~ 0 : KS3 ~ 0

Strobe signals for keys and POP UP Display are generated at KS3 - 0.

2.3. Key Return Signal

PIN No.	CPU PORT	Signal name	Function
38	P60	KR0#	KEY RETURN SIGNAL 0
37	P61	KR1#	KEY RETURN SIGNAL 1
36	P62	KR2#	KEY RETURN SIGNAL 2
35	P63	KR3#	KEY RETURN SIGNAL 3
34	P64	KR4#	KEY RETURN SIGNAL 4
33	P65	KR5#	KEY RETURN SIGNAL 5
32	P66	KR6#	KEY RETURN SIGNAL 6
31	P67	KR7#	KEY RETURN SIGNAL 7

4. DISPLAY

FRONT:



1.2.3.4.5.6.7.

- Display DIGIT signal

The above ST0 ~ ST6 are display digit signals.

ST0: 1st digit ~ ST6: 7th digit

- Display SEGMENT signal

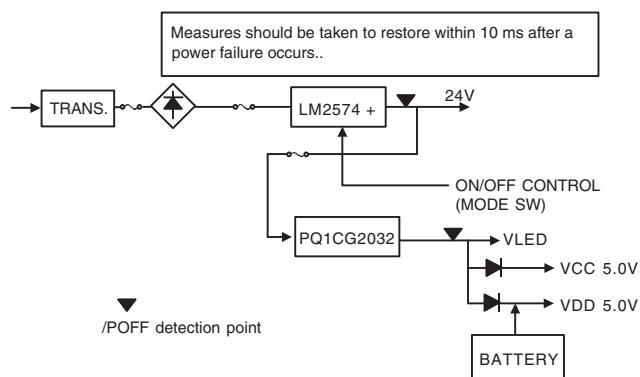
The LED segment signal is outputted by writing SEGMENT data in the /CS3 space.

Correspondence of DATA ~ SEGMENT

$$D0 \sim D6 \rightarrow A \sim g$$

D7 → DP

[6] POWER SUPPLY



[7] RE-WRITING FLASH MEMORY

IPL from EP-ROM: After IPL Short pin is set to VCC position the program is started from EP-ROM by turning on the power.
The program on EP-ROM is transferred to flash ROM by switching the banks through S-RAM.

[8] DRAWER

The XE-A40S has a 1 drawer port. (No open sensor is provided.)

The driving time for the DRAWER solenoid are as follows: 50ms (max)
45ms (min)

[9] PRINT RATE

384 dots/1 line

[10] A/D CONVERSION

The printer power supply voltage should be measured at more than 10 ms after the printer is turned ON.

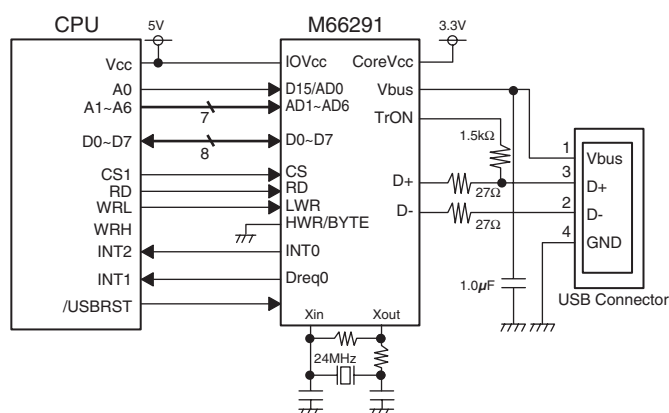
[11] BUZZER

PIEZO type BUZZER

The oscillating frequency is $4.0\text{kHz} \pm 0.5\text{kHz}$

[12] USB I/F

The XE-A40S is equipped with 1 USB port (slave) as a standard provision. By use of the USB general-purpose ASSP device M66291 (RENESAS), it sends and receives USB data. The M66291 is mapped to the /CS1 area (28000H ~ 3FFFFFFH). The CPU and the M66291 are connected as shown in the figure below.



<CPU Port>

Pin No.	CPU PORT	SIGNAL	Application
19	P83 (INT1)	/DREQUSE	USB DMA CHANNEL 0 DMA Request signal
18	P84 (INT2)	/INTUSB	USB Interrupt 0 Request signal
26	P74	/USBRSST	USB reset signal

Access from CPU to M66291 : 28000H + Register Address (00~77H)

Input clock uses 24MHz.

[13] RESET

The RESET signal is generated when:

- 1) The mode key switch is turned from SRV to a position other than SRV'(excluding OFF).
- 2) The power is turned ON more than 10 seconds after the power is turned OFF. (The reset signal may not be issued if the POWER-OFF time is short.)
- 3) The mode key switch is turned from OFF to a position other than OF (excluding the SRV position). (If the power-off time is less than 5 seconds, the reset signal may not be issued.)

CHAPTER 5. DIAGNOSTIC PROGRAM

[1] TEST ITEMS

The test items are as follows:

	Code	Description
1)	100	Display buzzer test
2)	101	Key code
3)	102	Printer test
4)	104	Keyboard test
5)	105	Mode switch test
6)	106	Printer sensor test
7)	107	Clock display test
8)	110	Drawer 1 open & sensor test
9)	120	External RAM test
10)	121	CPU internal RAM test
11)	130	FLASH ROM test
12)	160	AD conversion port test
13)	520	USB TEST

* Starting DIAG

Mode switch: PGM

Key operation: Above code + "RCPT/PO" key

[2] DESCRIPTION OF EACH DIAG PROGRAM

1. DISPLAY BUZZER TEST

1.1. Key operation

100 → RCPT/PO

1.2. Test procedure

OP display

D	I	S	P		B	U	Z	Z	E	R		P	G	M	
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Rear display 4.5.6.7.8.9.0.

The decimal point on the LED and the cursor on the LCD will shift from the lower digit to the upper digit in steps of 1 digit (every 200 msec)

After that, all segments will turn on (about 1 sec).

These two modes are repeated.

At the same time, the buzzer sounds continuously.

1.3. Check that:

- Each position is correctly displayed.
- The brightness of each number is uniform.
- The buzzer sound is normal.

1.4. End of testing

You can exit the test mode by pressing any key. The following is printed.

1 0 0

2. KEY CODE

2.1. Key operation

101 → RCPT/PO

2.2. Test procedure

OP display

K	E	Y		C	O	D	E					P	G	M	

KEY CODE

2.3. Check that:

KEY code: Every time a key is pressed, the hard code of that key is displayed as a decimal number.
When a key is pressed twice or pressed in an incorrect manner, --- will be displayed.

2.4. End of testing

You can exit the test mode by turning the mode switch to a position other than the PGM mode. The printer prints as follows:

1 0 1

3. PRINTER TEST

3.1. Key operation

102 → RCPT/PO

3.2. Test procedure

OP display

R	/	J		P	R	I	N	T	E	R		P	G	M	

Enlargement

△△△	-----	△△△
▽▽▽	-----	▽▽▽
△△△	-----	△△△
▽▽▽	-----	▽▽▽
□□□	-----	□□□

5 lines of 24 digits are printed.

At the receipt side, the logo is also printed and the receipt is issued.

3.3. Check that:

The print is free from contamination, blur, and uneven density.

3.4. End of testing

The test will end automatically.

4. KEYBOARD TEST

4.1. Key operation

--- 104 → RCPT/PO
↑
KEY check sum code

4.2. Test procedure

The keyboard is checked using the check sum code of the key code.

If the check sum code is not entered, the check is made using the check sum code of the default keyboard arrangement.

The check sum data for each model is entered to the front 4 digits of the DIAG code, and that data is compared with the key data added until the final key (CA/AT) is pressed.

Both data are the same, the test ends, printing the number given below.

If both data are different, the printer prints the error message.

OP display

K	E	Y		B	O	A	R	D			P	G	M	
1	0	4												

KEY CODE

4.3. Check:

- The content of completion print

4.4. End of testing

When the test ends normally: 104
When an error occurs: E --- 104

NOTE: Calculation of key check sum data

Hard codes (hexadecimal number) at the position (excluding feed key) where there is an input data contact are added.

However, the final key (CA/AT) is not added.

This data to which hard codes have been added is converted into a decimal number value, which will become the check sum data that will be entered when DIAG is started.

5. MODE SWITCH TEST

5.1. Key operation

105 → RCPT/PO

5.2. Test procedure

OP display

M	O	D	E		S	W				P	G	M	
1	0	5											X

MODE: PGM_VOID_OFF_OP X/Z_REG_MGR_X1/Z1_X2/Z2_PGM
X : 1 2 9 3 4 5 6 7 1

The above X must be read in the correct order. (If the contact is open, 9 will be displayed.)

5.3. Check:

The display during testing and the content of the completion print.

- At "OFF" position state, nothing is displayed after displaying 9.

5.4. End of testing

When the test ends normally: 105
When an error occurs: E --- 105

6. PRINTER SENSOR TEST

6.1. Key operation

106 → RCPT/PO

6.2. Test procedure

Check the status of the paper end sensor and head up sensor.

OP display

R	/	J		S	E	N	S	O	R			P	G	M	
1	0	6										X	-	Y	

6.3. Check the following

- X: 1 - Paper present at the receipt side
O - No paper at the receipt side
Y: 1 - Paper present at the journal side
O - No paper at the journal side

6.4. End of testing

You can exit the test mode by pressing any key and the printer prints the following.

1 0 6

7. CLOCK TEST

7.1. Key operation

107 → RCPT/PO

7.2. Test procedure

OP display

T	I	M	E	R		C	H	E	C	K		P	G	M	
1	0	4				*	*	-	*	*	*	*	*	*	*

Hour Min. Sec.

Blinks at an interval of 0.5 sec.

7.3. Check that:

"-" blinks and the clock counts up.

7.4. End of testing

When any key is pressed, the date and time are printed and the test mode will be terminated.

107 X X X X X - X X X X X
 year month day hour min. sec.

8. DRAWER 1 OPEN & SENSOR TEST

8.1. Key operation

110 →

RCPT/PO

8.2. Test procedure

OP display

D	R	A	W	E	R	1					P	G	M	
														X

X : O = DRAWER OPENED

C = DRAWER CLOSED

8.3. Check that:

- The drawer 1 opens normally.
- Always displays O (Opened), because XE-A40S doesn't have an open sensor.

8.4. End of testing

You can exit the test mode by pressing any key. The printer prints the following.

1 1 0

9. EXTERNAL RAM TEST

9.1. Key operation

120 →

RCPT/PO

9.2. Test procedure

The standard 256 Kbyte RAM is checked.

The contents of memory must be stored before and after this test.

RAM (08000H ~ 27FFFH area and 30000H ~ 4FFFFH area) is tested in the following procedure:

- Store data in the test areas
- Write "00H"
- Read and compare "00H" and then write "55H"
- Read and compare "55H" and then write "AAH"
- Read and compare "AAH"
- Restore stored data

If an error occurs at a step, the error is printed.

If any error does not occur, the following addresses are checked in turns.

Addresses to be checked:

10000H , 10001H , 10002H , 10004H , 10008H ,
 10010H , 10020H , 10040H , 10080H ,
 10100H , 10200H , 10400H , 10800H ,
 11000H , 12000H , 14000H , 18000H ,
 20000H
 30000H , 30001H , 30002H , 30004H , 30008H ,
 30010H , 30020H , 30040H , 30080H ,
 30100H , 30200H , 30400H , 30800H ,
 31000H , 32000H , 34000H , 38000H ,
 40000H

OP display

R	A	M								P	G	M	
1	2	0											

9.3. Check:

- The completion print.

9.4. End of testing

The program ends after printing as follows:

When the test ends normally: 120
 When the test end abnormally: **Ex ---** 120

x = 1:Data error

x = 2:Address error

When an error occurs, the printer outputs the error message and the address where the error has occurred in the area *****.

10. CPU INTERNAL RAM TEST

10.1. Key operation

121 →

RCPT/PO

10.2. Test procedure

The test program tests internal RAM (10 Kbytes) of the CPU.

The contents of memory must be stored before and after this test.

RAM (00400H ~ 02BFFH area) is tested in the following procedure.

- Store data in the test area.
- Write "00H"
- Read and compare "00H" and then write "55H"
- Read and compare "55H" and then write "AAH"
- Read and compare "AAH"
- Restore stored data

If an error occurs at a step, the error is printed.

If any error does not occur, the following addresses are checked in turns.

Addresses to be checked:

01000H , 01001H , 01002H , 01004H , 01008H
 01010H , 01020H , 01040H , 01080H ,
 01100H , 01200H , 01400H , 01800H ,
 02000H

OP display

C	P	U		R	A	M					P	G	M	
1	2	1												

10.3. Check:

The completion print.

10.4. End of testing

The test program ends after printing.

When the test ends normally: 121
 When the test end abnormally: **Ex ---** 121

x = 1:Data error

x = 2:Address error

If an error occurs, the printer outputs the error message and the address where the error has occurred in the area *****.

11. FLASH ROM TEST

11.1. Key operation

130 → RCPT/PO

11.2. Test procedure

The test program checks that the checksum of the flash ROM (BANK0F80000H ~ FFFFFH).

The lower two digits of the check sum should be 10H.

OP display

F	L	A	S	H	R	O	M			P	G	M	
1	3	0											

11.3. Check:

The completion print.

11.4. End of testing

The test will automatically be terminated and the printer prints as follows:

When the test ends normally: **130**
 ROM ***** (Model name)
 ***** (Version)

When the test ends abnormally: E --- ~ --- **130**
 ROM ***** (Model name)
 ***** (Version)

12. AD CONVERSION PORT TEST

12.1. Key operation

160 → RCPT/PO

12.2. Test procedure

The test program displays the voltage of each AD conversion port.

Display

OP display

T	M				=	*	*	*	*	P	G	M	
1	6	0											

OP display

V	R	F			=	*	*	*	*	P	G	M	
1	6	0											

OP display

V	P	T	E	S	T	=	*	*	*	*	P	G	M
1	6	0											

End of testing

13. USB COMMUNICATION TEST 1(ID/Address print)

13.1. Key operation

520 → CH

13.2. Detail of the test

USB revision, Vendor ID, Product ID, and the device address assigned by the host are printed.

13.3. Display print

13.3.1 Display

OP display

U	S	B		T	E	S	T	1			P	G	M
5	2	0											

13.3.2 Print

* Only the journal side. The receipt side is not printed.

520

USB Rev. Ver. XXX
 VENDOR ID 04DD
 PRODUCT ID 90B6
 DEVICE ADDRESS X

(Device address)

←When the host is connected: 1

←When the host is not connected: 0

13.4. Test completion

After completion of printing, the test is terminated automatically.

[3] KEY CODE TABLE

XE-A40S

↑ RF	↑ JF
033	037
032	048
038	054
039	055

052	132	116
050	130	114
053	133	117
128	129	113
118	112	

083	067	147	148
084	068	146	018
082	066	149	145
085	069	065	064
081	080	086	070
102	103	087	071

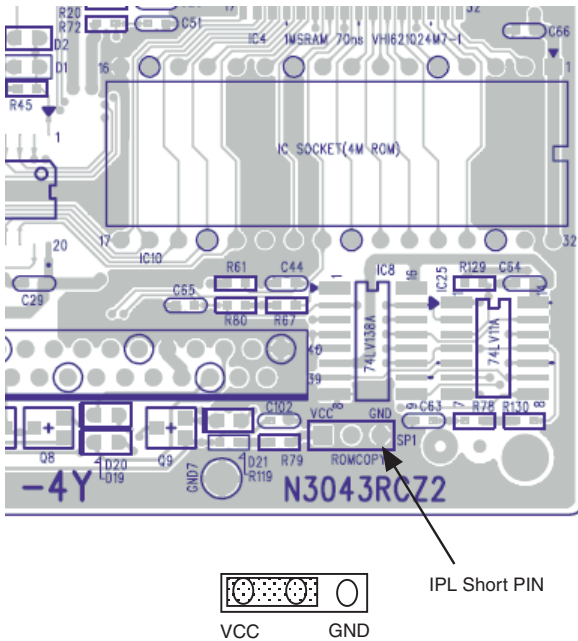
003	004
002	005
017	001
016	000
022	006
007	

CHECK SUM : 4 0 7 5

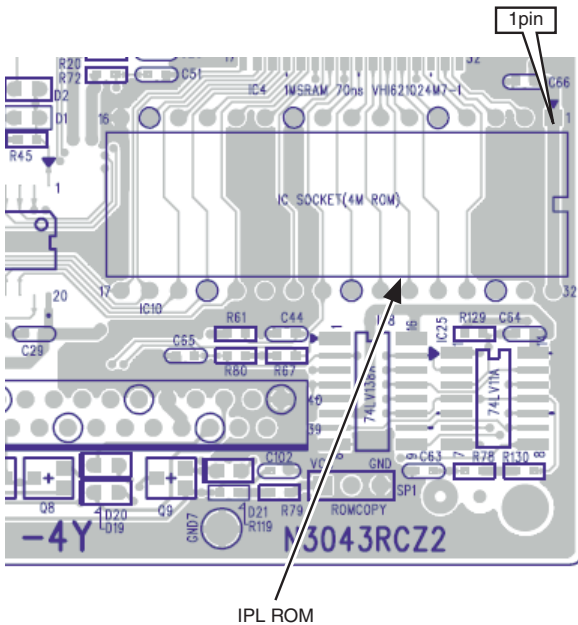
CHAPTER 6. IPL FROM EP-ROM

Before working on the installation, unplug the AC cord from the AC outlet.

- 1) Open the top cabinet.
- 2) Set the IPL Short PIN (SP1) to VCC position.



- 3) Install the IPL ROM to the IC socket of the MAIN PWB.



- 4) Turn the mode key switch to PGM position, and insert AC plug in AC outlet.

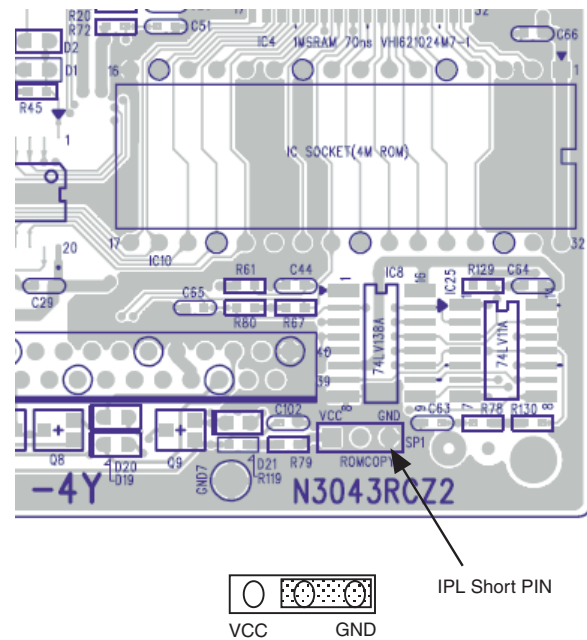
- 5) The IPL procedure is started.

When the procedure is completed, the message of "Completed." is shown.

P ROM COPY
Completed.

- 6) Unplug the AC cord from the AC outlet.
- 7) Remove the IPL ROM to the IC socket of the MAIN PWB.

- 8) Set the IPL Short PIN (SP1) to GND position.



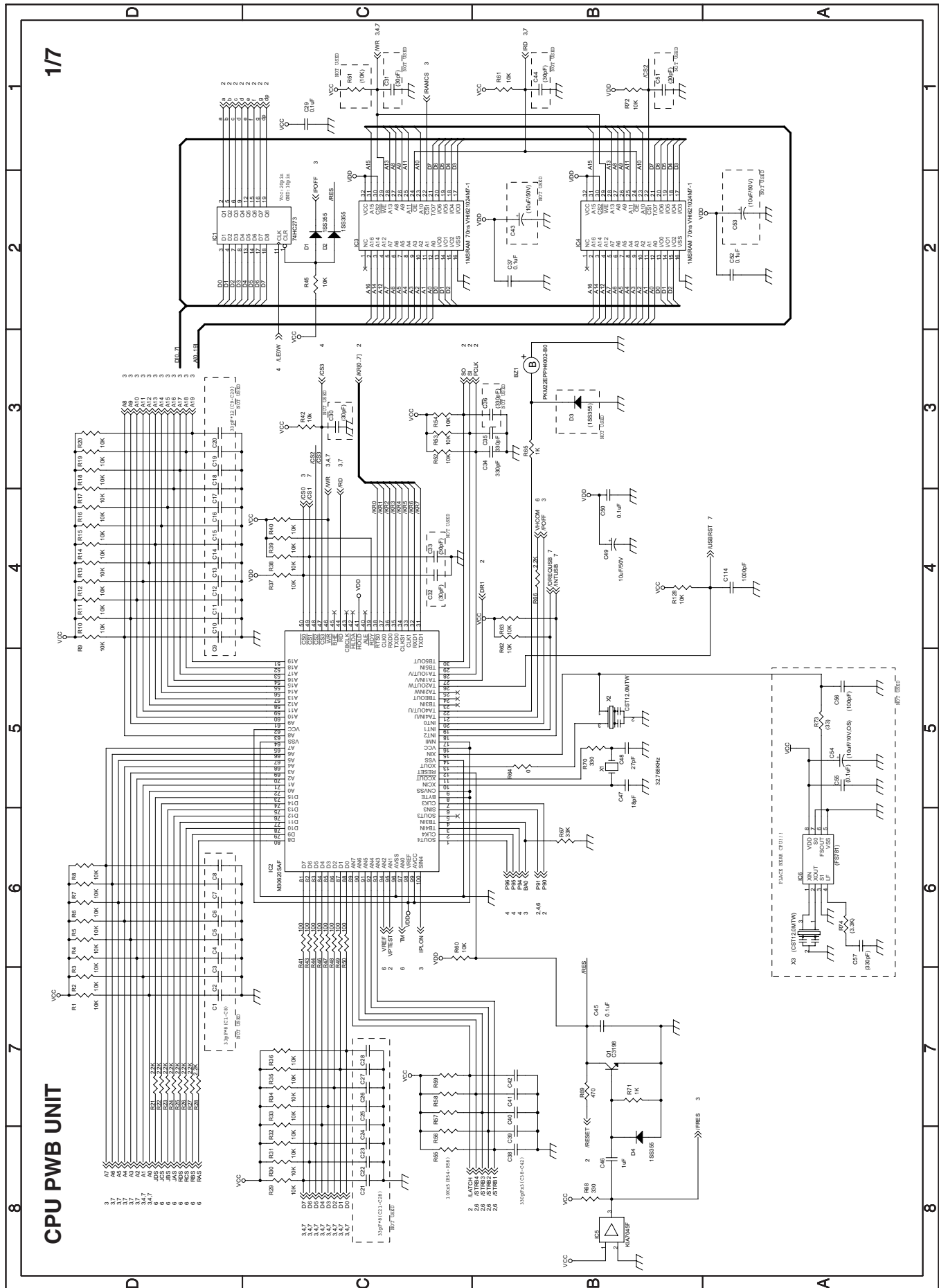
- 9) Replace the top cabinet.

- 10) Perform a master reset.

At the PGM mode, while holding down Journal feed key and CL key, insert AC cord in AC outlet.

MRS.

CHAPTER 7. CIRCUIT DIAGRAM AND PWB LAYOUT



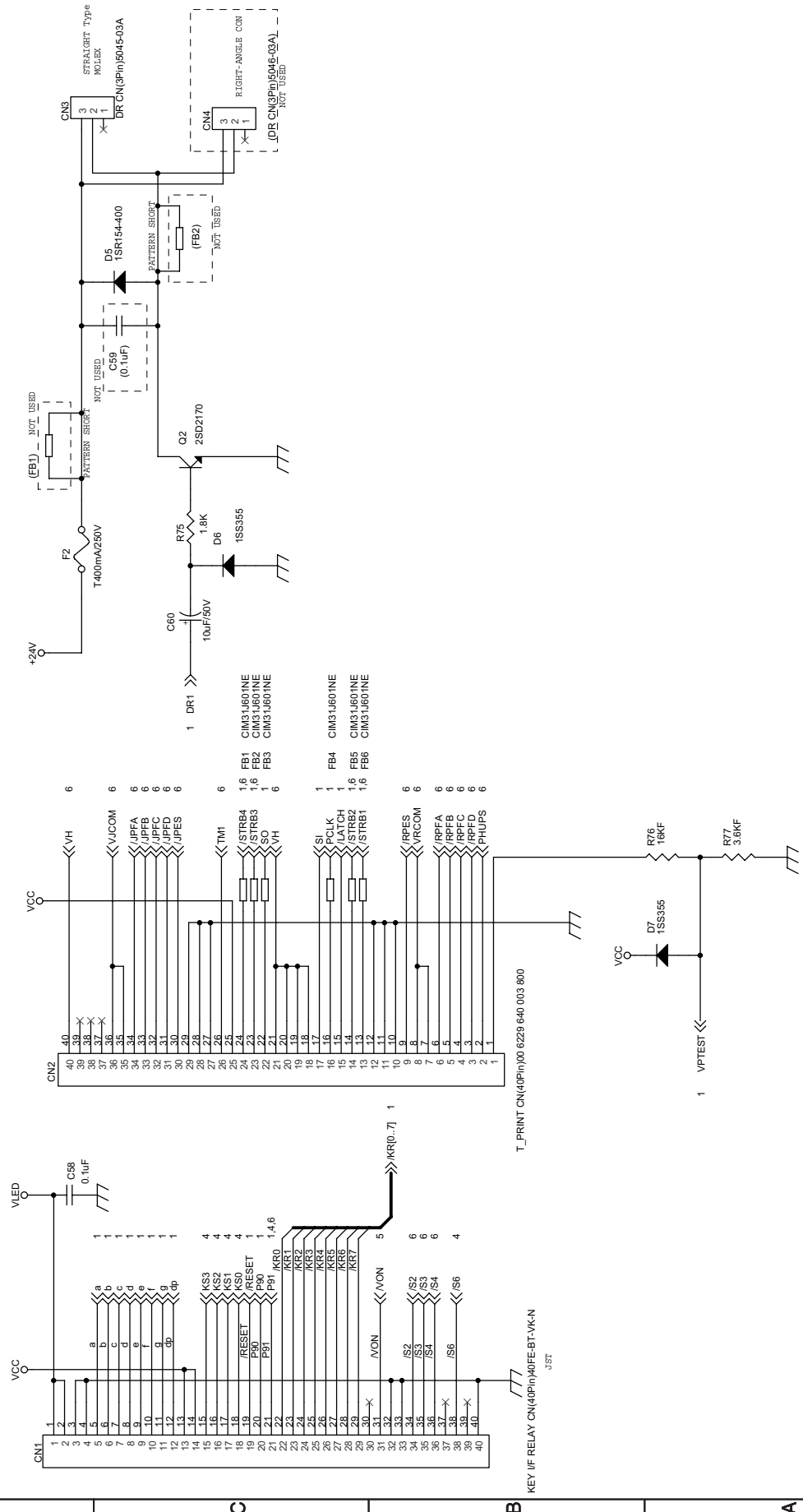
DRIVER PWB

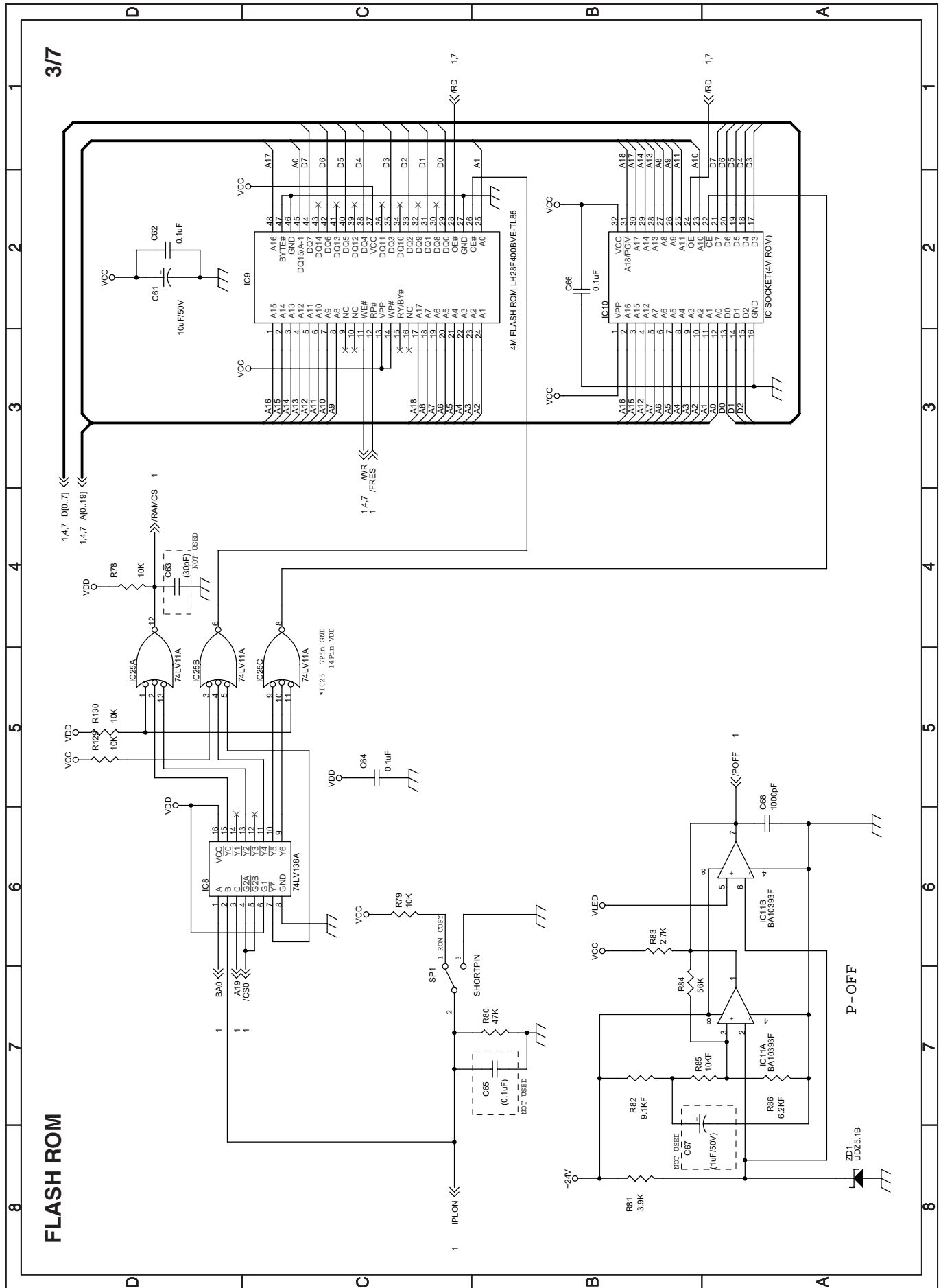
2/7

KEY I/F

PRINTER I/F

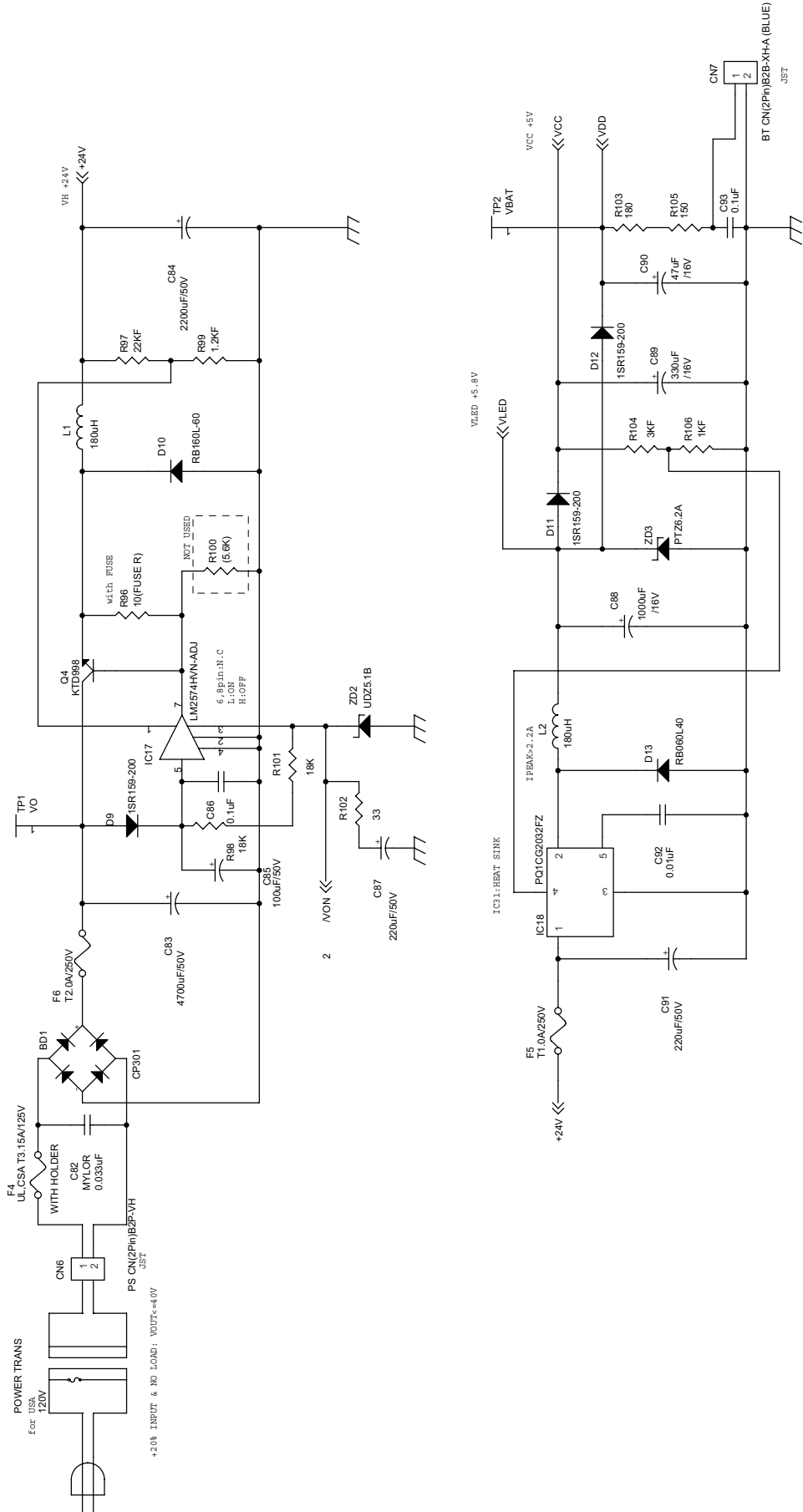
DRAWER

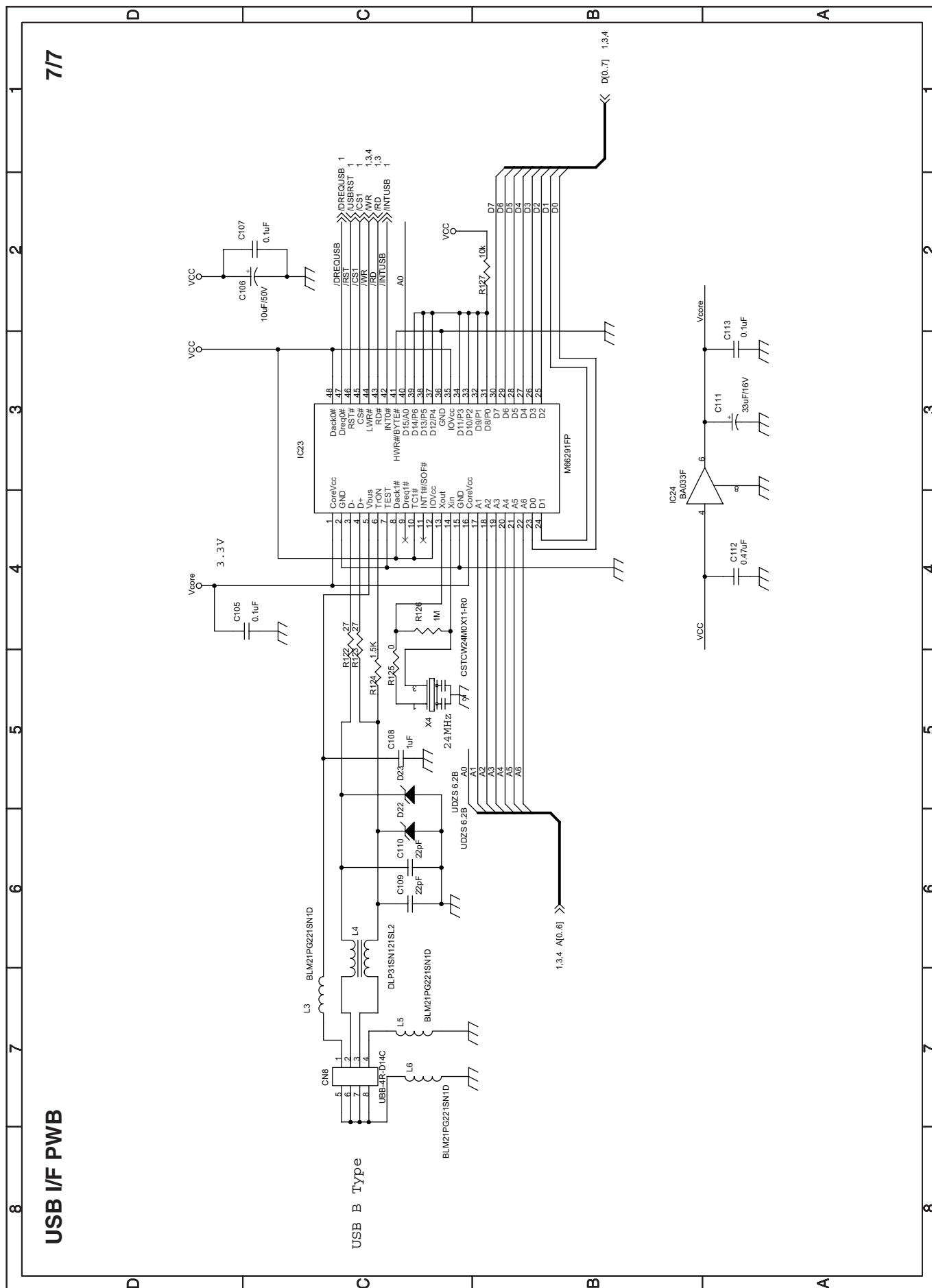




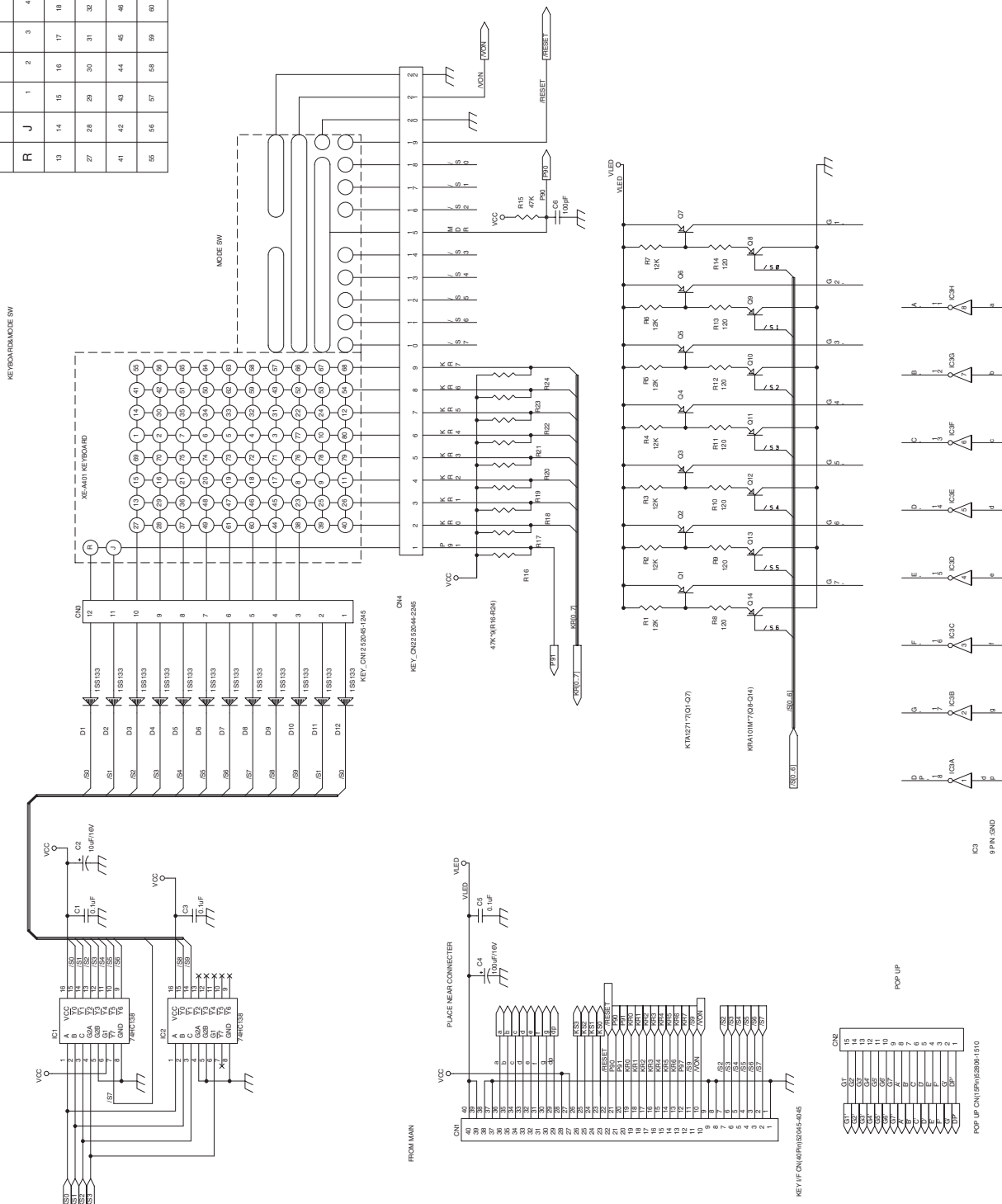
POWER SUPPLY PWB

5/7





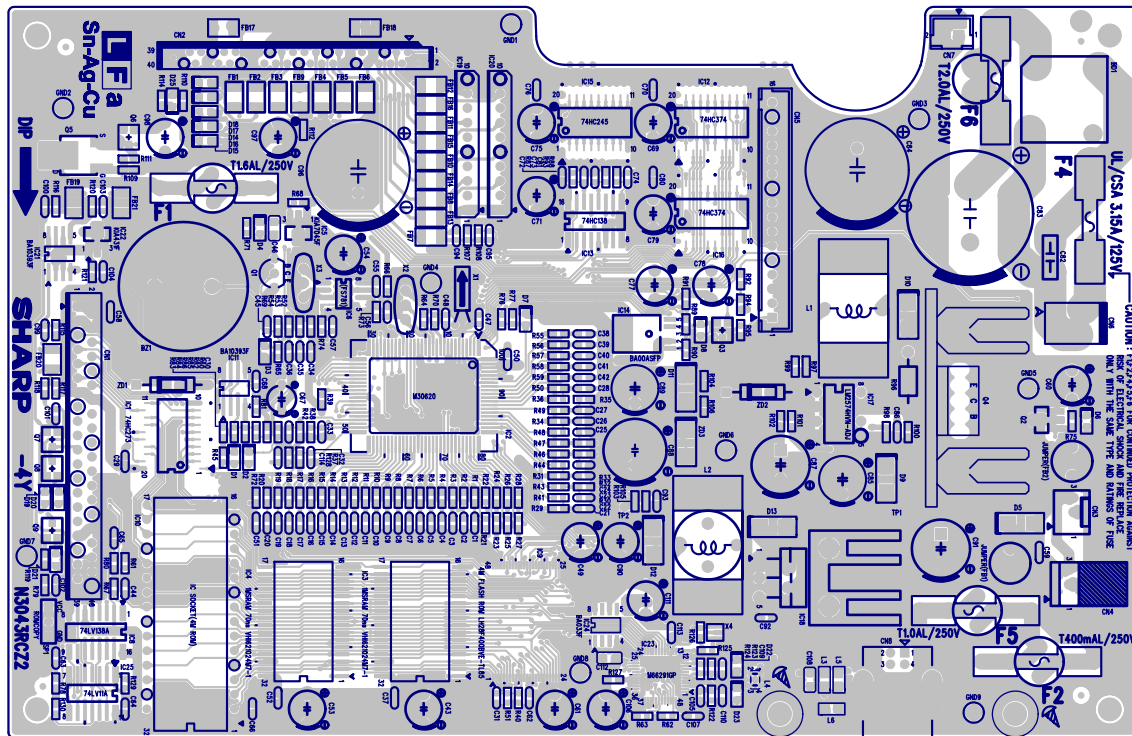
		69	70	71	72	73	74	75	76	77	78	79	80
	R	J	1	2	3	4	5	6	7	8	9	10	11
10	14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63	64	65	66	67	68



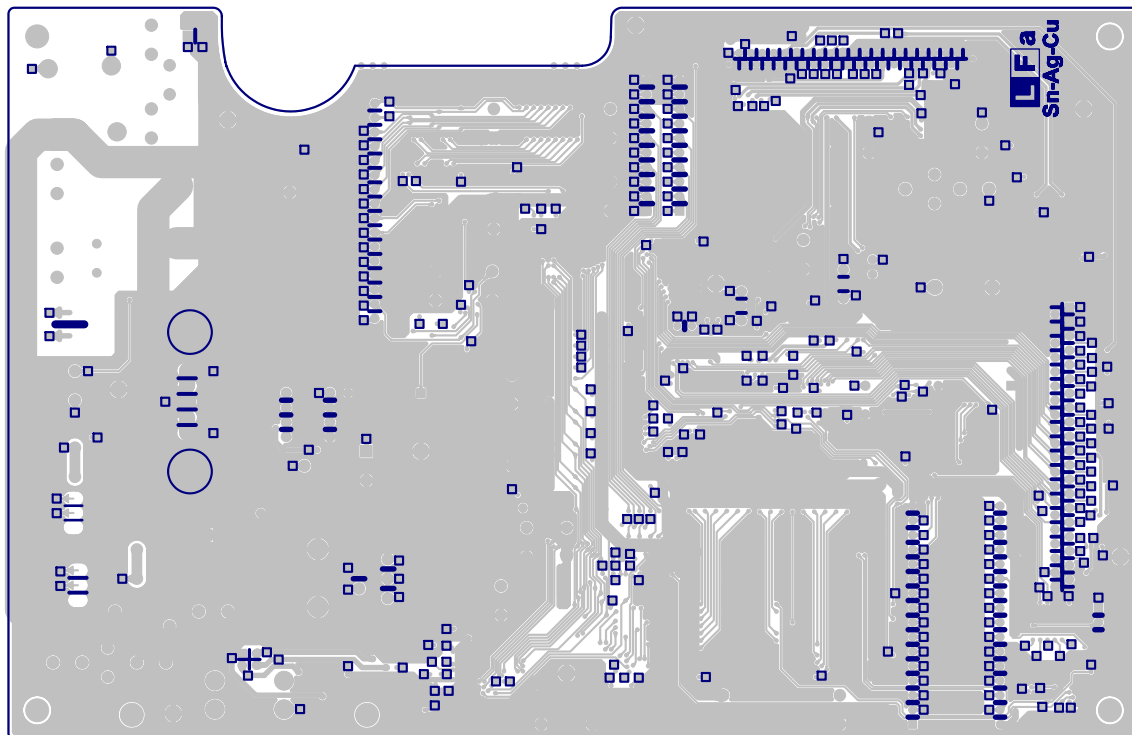
PWB LAYOUT

1. MAIN PWB LAYOUT

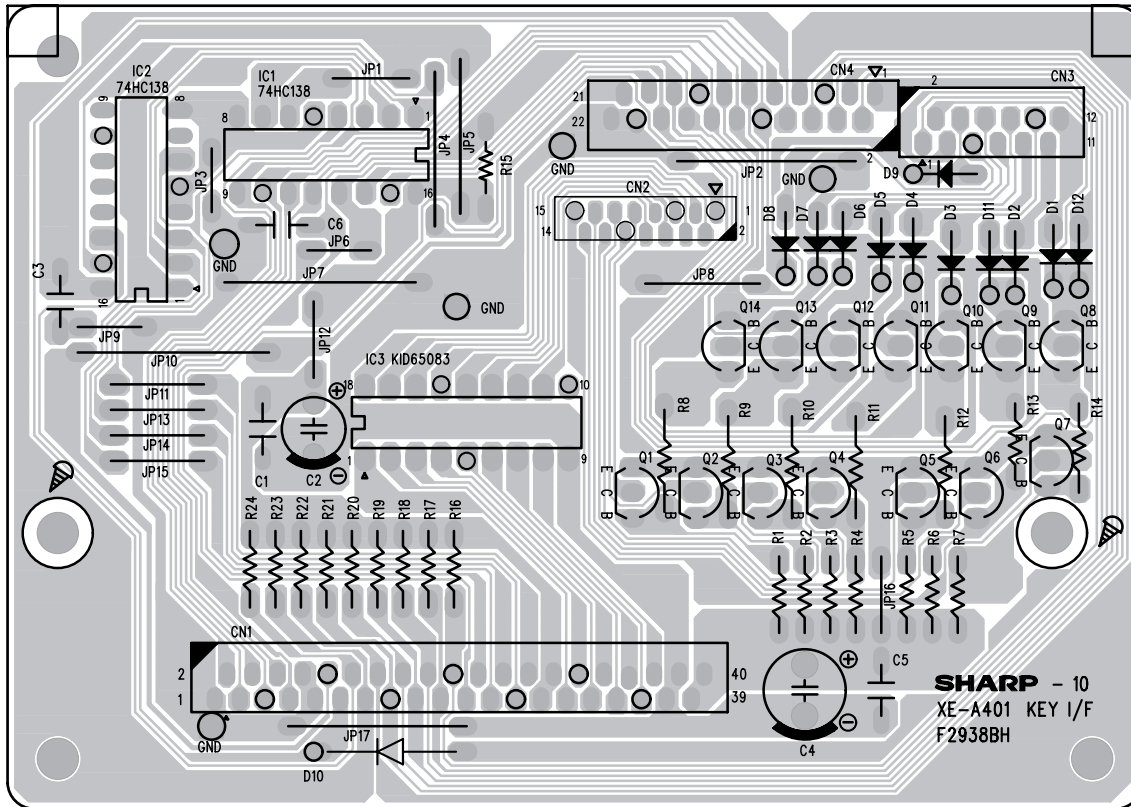
A Side



B Side



2. KEY I/F PWB LAYOUT



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